

Staff Report on:  
**AIR QUALITY RULES AND REGULATIONS:  
TRENDS AND RESTRUCTURING IMPLICATIONS**

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June 18, 1996

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# **AIR QUALITY RULES AND REGULATIONS**

Recent revisions to the Federal Clean Air Act (FCAA) in 1990 and the California Clean Air Act (CCAA) in 1991 have required major changes to many local air pollution control districts' air quality management plans and rules and regulations. This paper provides an overview of these laws, and related rules and regulations, and some possible implications for the restructuring of the electricity industry in California, and addresses part of Issue I.C.4 of the *ER 96* February 15, 1996 Issues Order.

## **The Federal Clean Air Act Amendments**

The FCAA requires comprehensive planning efforts from ozone non-attainment areas that are classified as serious, severe or extreme. There are six such areas in California, encompassing eleven separate air pollution control districts. The areas are: Sacramento Metropolitan, San Diego, San Joaquin Valley, South Coast, Southeast Desert, and Ventura. Each is assigned a statutory deadline for achieving the national ozone ambient air quality standards, which ranges from 1999 for serious areas, 2005 and 2007 for severe areas, to 2010 for extreme areas.

Each district plan must contain a current emission inventory, adequate ambient air quality data, and photochemical modeling analyses of the area's possible future air quality. In addition, each plan must meet statutory emission reductions of 15 percent for organic gases (VOC) between 1990 and 1996, an additional 9 percent reduction of VOC emissions by 1999, and a 3 percent reduction of VOC emissions per year for each year thereafter. The FCAA also prescribes certain minimum emission control requirements for each ozone non-attainment area that are based on the severity of existing air quality problems.

## **The California Clean Air Act**

The CCAA requires that districts achieve the state ambient air quality standards by the earliest practicable date. To meet this objective, the CCAA prescribed a number of control strategies, and a considerable amount of planning and re-planning to maintain a steady course toward attainment. In contrast to the FCAA, the CCAA identifies criteria to be used to designate the non-attainment status of an area based on the current ambient air quality conditions of the area. For ozone, an area is designated as moderate if the ambient ozone concentration is between 0.09 ppm and 0.12 ppm, serious if it is between 0.13 and 0.15 ppm, severe if it is between 0.16 and 0.20 ppm, and extreme if it is greater than 0.20 ppm.

The CCAA requires districts to develop and adopt plans for improving air quality. At a minimum, each plan must demonstrate a 5 percent yearly reduction of ozone precursors, NO<sub>x</sub> and VOC; employ uniform controls within an air basin; contain mitigation for transported air

contaminants; contain aggressive transportation control measures; and contain public education programs. Air districts can opt-out of the 5 percent yearly reduction requirements, provided an air quality management plan has been developed to require Best Available Control Technology (BACT) and Best Available Retrofit Control Technology (BARCT) for all large sources in the district. The air quality management plans are to be evaluated on an annual basis, be revised every three years, as needed, and major revisions are required every six years.

## **CURRENT RULES AND REGULATIONS SUMMARY**

Currently in California, any new projects or modifications to existing facilities, including power plants, that have potential emissions greater than a certain threshold level must be equipped with BACT and must offset their emission increases with emission reduction credits (ERCs).

### **Best Available Control Technology (BACT)**

Currently, BACT is required to be used on any new or modified emission unit which results in a certain level of emissions increase. The BACT trigger levels vary from district to district. They can be as low as zero - any increase in emissions for districts with severe air quality problems - or as high as 15 tons per year (TPY) of any criteria pollutants for districts that have relatively clean air. Typically, BACT for a combined cycle power plant or for a utility boiler includes a combination of natural gas-firing, a carbon monoxide (CO) catalytic oxidation system, and a selective catalytic reduction (SCR) system. BACT for small boilers is usually an emission limit, i.e., 75 to 150 ppm for NO<sub>x</sub> and efficient combustion for other pollutants. This gives operators some flexibility in complying with emission limits, including fine tuning the units or installing control devices, such as Lo-NO<sub>x</sub> burners. BACT for new biomass-fueled boilers is usually a selective non-catalyst reduction (SNCR) system for NO<sub>x</sub>, scrubbers for SO<sub>x</sub>, and either a high-efficiency multiclone collector or a fabric collector for PM<sub>10</sub>.

### **Best Available Retrofit Control Technology (BARCT)**

As a result of the California Clean Air Act (CCAA), many districts are now requiring existing sources, including power plants, to be retrofitted with emission control devices. BARCT for combined cycle power plants is varied, depending on the size of the turbines. For example, for units greater than 10 MW, BARCT limits are 9 ppm and 25 ppm NO<sub>x</sub> for natural gas and oil firing, respectively, and are achievable with the installation of an SCR system. For smaller units, the limits are 25 and 65 ppm NO<sub>x</sub> for natural gas and oil-firing, respectively, and are achievable with the installation of Lo-NO<sub>x</sub> burners. BARCT limits for utility-size

boilers are 30 ppm and 40 ppm NO<sub>x</sub> for natural gas and oil-firing, respectively, and are achievable with either SCR or Lo-NO<sub>x</sub> burners.

Because most biomass boilers are recently permitted, BACT has normally been required. Because there has been no recent advancement in NO<sub>x</sub> emission control for these facilities, most of the current control devices and emission limits are still considered BACT. Therefore, most districts do not see a need to require BARCT for these existing boilers.

## **Offsets**

Offsets are emission reductions, achieved by controlling emissions from one or more existing sources, to displace emission increases from new, or modified facilities. The emission reductions provided must be at least equal to the new emissions, and in some cases they may be discounted by as much as 60 to 70 percent if they are from sources located far from the new source. The offset concept is based largely on the assumption that air pollutants within a region, sometimes referred to as an air basin, are well mixed. Therefore, if increases in emissions from the new facility are being offset by reducing emissions from an existing source within the same air basin by at least the same or greater quantity, the ambient air quality conditions should be maintained. In addition, if the offsets must be provided in quantities that are larger than the new emissions, without taking into consideration the distance of the offsets from the new source, then the excess emission reductions can be used to mitigate emissions for other smaller sources that are exempt from offsets.

Traditionally, ERCs have been obtained from stationary sources. However, with the adoption of new and more stringent air quality regulations, the ERC pool available from stationary sources is limited and continuing to diminish. Project proponents are now starting to look at other emission sources to obtain ERCs, including area sources, mobile sources, and other creative ways to offset new emissions, including inter-district and interpollutant offsets. Following is a brief discussion of these options.

### **Area source offsets**

Area sources are generally described as many small sources which individually emit a small amount of air pollutants, but cumulatively can produce significant emissions. Examples of these sources included, but are not limited to, residential fuel combustion appliances (home heaters, water heaters), lawn mowers, or residential wood stoves. Although area sources provide some additional options for offsetting emissions increases, procedures for their use have not yet been adequately developed in many districts, and so there has not been much interest in using them.

## **Mobil source offsets**

Mobil source ERCs are generated from motor vehicle emission reductions in excess of that required by existing standards imposed by the Air Resources Board (ARB) or the federal Environmental Protection Agency (EPA). Mobil source ERCs can be generated through the accelerated retirement of older vehicles, the purchase of low emission buses, the purchase of zero emission vehicles, the retrofitting of heavy-duty vehicles to low emission configurations, or the purchase of new, reduced emission heavy-duty vehicles in lieu of new heavy-duty vehicles that just meet the current standards.

So far, accelerated retiring of old cars is the only successful program that has been used to offset new emissions. Two small cogeneration facilities are using this option to obtain necessary ERCs for mitigation of new emissions. Also, a few companies and groups have used the program to postpone compliance dates with district rules, to improve air quality, and to offset new facilities' emissions.

## **Inter-district offsets**

State law allows ERCs from one district to be used to offset new emissions from another source located in another district in the same air basin. The law stipulates that the district where the offset source is located will evaluate the available ERCs, and the district where the new source is located will use the available amount to mitigate the new source's emissions in a manner similar to the use of offsets located within the district.

Federal law also allows the use of inter-district offsets, provided that both districts are located in the same federal ozone planning area, and that the district where the offset source is located has a worse or equivalent non-attainment status compared to the district where the new source is to be located.

## **Interpollutant offsets**

Interpollutant offsets involve the use of one air pollutant to offset emissions of another air pollutant. The concept is based on the assumption that one pollutant is a precursor to another. For example, the law recognizes that  $\text{NO}_x$  and VOC are precursors to the formation of ozone and  $\text{PM}_{10}$ . Therefore,  $\text{NO}_x$  or VOC emission reduction credits can be used to offset new  $\text{PM}_{10}$  emissions. The offsets, however, must be used with a discount factor to be determined on a case-by-case basis because of the lack of understanding of the exact contribution of precursors to the specific criteria pollutants to be offset. The ARB staff has recommended a few generic interpollutant offset ratios for certain pollutants, such as  $\text{SO}_x$  for  $\text{PM}_{10}$ ,  $\text{NO}_x$  for  $\text{PM}_{10}$ , and VOC for  $\text{PM}_{10}$ . For precursors of ozone, i.e.,  $\text{NO}_x$  and VOC, the discount factor is determined based on the results of extensive modeling exercises that are usually not practical to perform during the permitting process because of time and cost constraints.

## **Large out-of-state power plants**

A review of the most recent permits from other states indicates that the BACT applied to those power plants varies widely. BACT ranges from 7 ppm NO<sub>x</sub> for a natural gas-fired turbine in Washington state, which is equipped with an SCR system, to 42 ppm NO<sub>x</sub> for similar sized turbines in New Mexico and Kentucky, which are equipped only with a water injection system. For utility- sized boilers, Lo-NO<sub>x</sub> burners typically satisfy out-of-state BACT requirements for natural gas, oil and coal. There are, however, a few boilers located in Washington and Florida which are required to be equipped with SNCR systems. Both of these boilers use biomass as fuel, and one of them uses coal and oil as supplemental fuels.

## **TRENDS IN AIR QUALITY RULES AND REGULATIONS**

The primary goal of air quality regulatory agencies is to achieve attainment and maintain the attainment of ambient air quality standards. To help do so, the agencies develop and implement sets of rules and regulations for stationary sources using two separate strategies: 1) Manage emissions growth through New Source Review rules; and 2) reduce existing emissions inventories through prohibitory rules, such as BARCT or Reasonably Available Control Technology (RACT). Although NSR rules are used to manage the emissions from the growth of stationary sources, they do not prohibit or eliminate the growth of new sources. To achieve attainment or to maintain the status quo of the existing ambient air quality conditions, air districts, in consultation with ARB, have developed rules such as BARCT and RACT that target existing sources that are considered to significantly contribute to the air quality problems in certain areas. As the goal is to achieve attainment or maintain the status-quo, the stringency of the rules will be dictated by the existing conditions of the area. For example, sources to be located in the South Coast air basin will face much more stringent requirements than if they are located in Lake County, the only area in the state which is attainment for both ozone and PM<sub>10</sub>.

Based on the past history of air quality regulatory agencies, staff can not conclude at this time that there is a trend in the development of rules and regulations. This is because the rules and regulations are developed by individual districts or the ARB if they find that a source category is contributing significantly to the air quality problems in an area. In the past 5 to 10 years, many air quality regulatory agencies have concentrated their efforts on addressing automobile emissions, which constitute a large part of their air pollution problems.

## **Best Available Control Technology**

With no further breakthrough developments in sight, SCR will continue to be the choice for BACT to control NO<sub>x</sub> emissions from combustion sources, which include utility boilers and

combined cycle facilities. CO catalyst control systems will continue to represent BACT for utility boilers and combined cycle facilities located in CO non-attainment areas. BACT for PM<sub>10</sub> and SO<sub>x</sub> will continue to be clean-burning fuel such as natural gas. As for biomass-fired boilers, staff does not know of any new facility that will be built in the near future because of the limited availability of biomass fuel. However, SNCR can still be considered to be BACT for such facilities if they are proposed.

## **Best Available Retrofit Control Technology**

Most existing power generating facilities are currently required to comply with BARCT requirements by installing unit-specific control technologies, and no new, stricter requirements are projected in the near future. Some major districts are revising their rules to provide greater flexibility to comply with the BARCT requirements without incurring excessive costs. This includes a system emission cap (San Diego), or a system-wide average emissions per unit of heat input (Bay Area or Monterey). These approaches allow some flexibility to owners to over-control some of their units and under-control other units to comply with the rule. Staff does not see any indication that BARCT limits will be tightened in the near future from the current level for biomass boilers.

## **Offsets**

### **Area source**

Interest in using

Staff is not aware of any current projects which are proposing to use these ERCs, probably due to their costs, and the difficulties in verifying that the emission reductions are actual, and enforceable. However, as more power plants or other large stationary sources are constructed and stationary source offsets become more scarce, the interest in and demand for area source ERCs may increase.

### **Mobil sources**

Mobil source ERCs offer businesses options for mitigation of new facility emissions, delaying the need to comply with district regulations, and, to some extent, have served as the foundation for the much-publicized market-based permit programs. There was much interest in the development of the specific guidelines and policies for the generation and use of mobil source ERCs, but the interest has diminished since the guidelines were published. There have been no formal approvals of any significant projects that have used mobil source ERCs since the release of the ARB guidelines in September 1993. In addition, there are only limited numbers of pre-72 model cars available that are qualified to use to generate ERCs. With respect to Zero Emission Vehicles (ZEVs), the lack of adequate technology advancement to produce marketable ZEVs means that the option to purchase ZEVs to generate ERCs shows



no immediate promise. However, as with area sources, as stationary source offsets become more scarce in the future, interest in mobile source credits is very likely to increase.

### **Inter-district**

Many districts have provisions in their existing rules to allow the use of ERCs from another district to offset new emissions from sources located within the district. Among all the offset options, inter-district offsets are likely to be the most actively used in the near future by project applicants due to the relatively easier requirements for their use which have been included in some recent rule changes.

### **Interpollutant offsets**

Previously, many district NSR rules required that the use of interpollutant offsets to mitigate new emission increases must 1) not cause a new violation of the existing ambient air quality standards, and 2) result in a net air quality benefit to the area. Some recent NSR rule revisions in a few districts have deleted the requirement that interpollutant offsets must result in a net air quality benefit. With this requirement deleted, it is much easier to use interpollutant offsets. Many future siting cases may use a combination of inter-district and interpollutant offsets together due to the relaxation of the need to verify a net air quality benefit. For example, ozone precursors such as volatile organic compound ERCs available from one area, which are cheaper to obtain, may be used to offset NO<sub>x</sub> emission increases from another area. Under these circumstances, during the siting of individual power plants, the Commission will need to evaluate whether such offset strategies effectively mitigate the effects of the new emissions from a proposed project.

## **Trends in rules and regulations indicated by some recent changes in some districts**

Some recent rule changes in the San Diego, Santa Barbara, Monterey, Kern County, Bay Area, and Sacramento districts indicate a clear trend: rules are being revised to make it easier to permit new stationary sources. The changes include:

1. The change from daily to quarterly or annual emissions accounting and offset requirements.
2. The elimination of complex analyses, such as a net air quality benefit analysis and the use of generic discount factors for offsets rather than case-specific offset ratio analyses.
3. The elimination of complex requirements to demonstrate a nexus between offsets and new emission sources, especially if the offsets are from either "area" or "mobile sources".

4. The introduction of an optional system-wide compliance demonstration to provide owners with the flexibility to reduce their compliance costs.

## **WHAT EFFECTS RESTRUCTURING MAY HAVE ON AIR QUALITY RULES AND REGULATIONS**

Currently, air quality rules and regulations impose a significant constraint on any new projects: the need to provide offsets. Providing offsets will continue to be a major problem, even with the additional offset options that have recently been made available. On the other hand, the change to the use of quarterly or annual rather than daily offset trigger levels may allow more small combined cycle power plants that operate below the offset trigger levels to be permitted without offsets. If restructuring results in the proliferation of many such small generation units in California, the resulting growth in emissions within certain air districts may exceed their assumed NSR emissions growth levels. Under these circumstances, some air districts may need to change their NSR rules to lower their offset trigger levels in order to assure that emissions from such facilities are adequately mitigated.

Based on some recent rule changes, staff believes that air quality constraints that affect the siting of power plants will not change in the near future. BACT and offsets are still the two major requirements that power plant applicants need to comply with. With respect to the possibility of repowering old power plants, the air quality rules, with the exception of San Diego County, will still require BARCT for each unit, and may allow the use of a system-wide average for compliance. In this respect, in districts where "system average" emission limitation rules exist, single unit owners - those who purchase utility-owned units that are divested - face more restrictive unit-specific requirements than large utilities, since they cannot use a system-wide approach to managing emissions. In the case of San Diego County, if SDG&E decided to sell some of its old power plants, it will benefit because the emissions cap would not change significantly. However, private businesses who purchase the old power plants will need to substantially retrofit them and find offsets for repowering them. Notwithstanding these requirements, staff does not believe that existing and likely proposed air quality rules and regulations will place any constraints on the repowering of existing projects that are greater than the constraints placed on new projects. This is because any new regulations must be cost-effective and any new control technology required must be achievable in practice. Therefore, repower projects with certain physical limitations for retrofitting may be exempt from additional control requirements. Notwithstanding, these facility-specific and "system-average" requirements, if divestiture occurs as the result of restructuring, districts may need to revise both their "system-average" and facility-specific emission limitation rules to accommodate the changes in ownership.